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- 2 1. (original) An apparatus for obtaining a representative sample from a fluid
- 3 stream having an isothermal condition, comprising:
- 4 a heat pipe having first and second segments, a length, and a main cavity
- 5 formed along its length;
- 6 a conduit having a central passage formed longitudinally therethrough, said
- 7 conduit formed of thermally conductive material, said conduit situated in
- 8 communication with said heat pipe;
- 9 said first segment of said heat pipe engaging said fluid stream, so as to thermally
- 10 effect said main cavity of said heat pipe;
- 11 whereby sample fluid passing through said conduit from said fluid stream
- 12 maintains an isothermal condition as it passes through said central passage of said
- 13 conduit.
- 14 2. (original) The system assembly of claim 1, wherein there is further provided a
- 15 plurality of heat pipes in longitudinal alignment.
- 16 3. (currently amended) The system assembly of claim 1, wherein said conduit is
- 17 integrated within said main cavity of said heat pipe.
- 18 4. (original) The system of claim 3, wherein said conduit is surrounded by working
- 19 fluid and vapor within said main cavity of said heat pipe.
- 20 5. (original) The system of claim 1, wherein said heat pipe is integrated into a
- 21 sample probe structure.
- 22 6. (currently amended) The system of claim 5, wherein said sample probe has an
- 23 external portion, and said first segment of said heat pipe is in thermal sink with said

1 fluid stream, and said second segment of said heat pipe thermally interfaces with
2 said external portion of said sample probe, ~~is formed~~ to offset ambient
3 environmental temperature influence on the external portion of said fluid sample
4 probe.

5 7. (original) The system of claim 6, wherein there is further provided a phase
6 separation membrane formed to remove liquid from a sample gas before entering
7 said conduit.

8 8.(original) The system of claim 7, wherein said sample probe has first and
9 second ends, and wherein said first end of said fluid sample probe is positioned
10 internal to the fluid stream and a second end is positioned external to said fluid
11 stream.

12 9.(currently amended) The fluid sample probe of claim 6, wherein the heat pipe
13 is formed within said sample probe structure.

14 10.(currently amended) An apparatus for obtaining a representative sample
15 from a fluid stream having an isothermal condition, comprising:

16 a vacuum jacket having first and second segments, a length, and a main cavity
17 formed along its length;

18 a conduit having a central passage formed longitudinally therethrough, at least a
19 segment of said conduit situated within said main cavity of said vacuum jacket;

20 said conduit having a first end communicating with said fluid stream;

21 whereby sample fluid passing through said conduit from said fluid stream is
22 insulated by said vacuum jacket so as to maintain an isothermal condition as it
23 passes through said central passage of said conduit.

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2 11.(currently amended) The fluid sample probe assembly of claim 10₁ wherein the
3 sample passageway is integrated within said vacuum jacket.

4 12. (currently amended) The fluid sample probe assembly of claim 10₁ wherein a
5 phase separation membrane is provided in the vicinity of said first end of said conduit to
6 remove liquid from a sample gas from said fluid stream.

7 13. (currently amended) The fluid sample probe of claim 10₁ wherein said
8 vacuum jacket is situated with a fluid sample probe having first and second ends, and
9 wherein said first end of said fluid sample probe is positioned internal to said fluid
10 stream, and said second end is positioned external to said fluid stream.

11 14. (currently amending) The fluid sample probe of claim 10₁ wherein said
12 vacuum jacket is formed within said fluid sample probe.

13 15.(original) An apparatus for obtaining a representative sample from a fluid
14 stream having an isothermal condition, comprising:

15 an insulated jacket having first and second segments, a length, and a main
16 cavity formed along its length;

17 a conduit having a central passage formed longitudinally therethrough, at least a
18 segment of said conduit situated within said main cavity of said insulated jacket;

19 said conduit having a first end communicating with said fluid stream;

20 whereby sample fluid passing through said conduit from said fluid stream is
21 insulated by said insulated jacket so as to maintain an isothermal condition as it
22 passes through said central passage of said conduit.

23 16. (currently amended) The apparatus of claim 15₁ wherein there is

1 further provided a phase separation membrane engaging said conduit, said phase
2 separation membrane formed to remove liquid from said fluid stream before entering
3 said conduit.

4 17. (currently amended) The apparatus of claim 15, wherein said
5 apparatus forms a fluid sample probe having first and second ends, said first end of
6 said fluid sample probe in communication with said fluid stream, said second end
7 positioned external to said fluid stream.

8 18.(currently amended) The fluid sample probe of claim 15, wherein said
9 insulated jacket is insulated with a plastic material.

10 19. (currently amended) The fluid sample probe of claim 18, wherein the
11 plastic material is Teflon.

12 20.(currently amended) The fluid sample probe of claim 18, wherein the
13 plastic material is Kynar.

14 21.(currently amended) The fluid sample probe of claim 18, wherein the
15 plastic material is nylon.

16 22.(currently amended) The fluid sample probe of claim 18, wherein the
17 plastic material is polypropylene.

18 23.(currently amended) The fluid sample probe of claim 18, wherein the
19 plastic material is polyethylene.

20 24. (original) The method of obtaining a sample fluid having an
21 isothermal condition from a fluid stream, comprising the steps of:

22 a. providing an apparatus, comprising:

23 a heat pipe having first and second segments, a length, and a main cavity

1 formed along its length;

2 a conduit having a central passage formed longitudinally therethrough, said
3 conduit formed of thermally conductive material, said conduit situated in
4 communication with said heat pipe;

5 said first segment of said heat pipe engaging said fluid stream, so as to thermally
6 effect said main cavity of said heat pipe;

7 b. positioning said heat pipe to thermally engage said fluid stream such that said
8 heat pipe develops an isothermal condition equivalent to said fluid stream;

9 c. allowing said thermally conductive material of said conduit to thermally
10 engage said heat pipe such that said conduit develops an isothermal condition
11 equivalent to said heat pipe;

12 d. directing a flow of sample fluid from said fluid stream into said conduit; and

13 e. retrieving said sample fluid from said conduit.

14 25. (original) The method of obtaining a sample fluid having an isothermal
15 condition from a fluid stream, comprising the steps of:

16 a. providing an apparatus, comprising:

17 an insulated jacket having first and second segments, a length, and a main
18 cavity formed along its length;

19 a conduit having a central passage formed longitudinally therethrough, at least a
20 segment of said conduit situated within said main cavity of said insulated jacket;

21 b. allowing said thermally conductive material of said conduit to thermally
22 engage said fluid stream such that said conduit develops an isothermal condition
23 equivalent to said ~~heat pipe~~ fluid stream;

1 c. directing a flow of sample fluid from said fluid stream into said conduit
2 while allowing said insulated jacket to thermally insulate said conduit from ambient
3 temperature; and

4 d. retrieving said sample fluid from said conduit.
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6 26.(currently amended) The method of obtaining a sample fluid having an
7 isothermal condition from a fluid stream, comprising the steps of:

8 a. providing an apparatus, comprising:

9 a vacuum jacket having first and second segments, a length, and a main cavity
10 formed along its length;

11 a conduit having a central passage formed longitudinally therethrough, at
12 least a segment of said conduit situated within said main cavity of said vacuum
13 jacket;

14 b. allowing said thermally conductive material of said conduit to thermally
15 engage said fluid stream such that said conduit develops an isothermal condition
16 equivalent to said ~~heat pipe fluid stream~~;

17 c. directing a flow of sample fluid from said fluid stream into said conduit
18 while allowing said vacuum jacket to thermally insulate said conduit from ambient
19 temperature; and

20 d. retrieving said sample fluid from said conduit.

21 27. (new) An apparatus for obtaining a representative sample from a fluid
22 stream having an isothermal condition, comprising:

1 a conduit having a central passage formed longitudinally therethrough, said
2 conduit formed of thermally conductive material,

3 isothermal regulation means for maintaining said conduit at an isothermal
4 condition utilizing said isothermal condition of said fluid stream;

5 whereby sample fluid passing through said conduit from said fluid stream
6 maintains an isothermal condition as it passes through said central passage of said
7 conduit.

8 28. (new) The apparatus of Claim 27, wherein said temperature regulation
9 means comprises a heat pipe.

10 29. (new) The apparatus of Claim 27, wherein said conduit has a length,
11 and wherein said temperature regulation means comprises insulation applied about
12 said length of said conduit.

13 30. (New) The apparatus of Claim 29, wherein said insulation comprises
14 a vacuum jacket.

15 31. (New) The apparatus of Claim 29, wherein said insulation comprises
16 an insulation jacket.

17 32. (New) The method of obtaining a sample fluid having an isothermal
18 condition from a fluid stream, comprising the steps of:

19 a. providing an apparatus, comprising:

20 a conduit having a central passage formed longitudinally therethrough, said
21 conduit formed of thermally conductive material,

22 temperature regulation means for maintaining conduit at said isothermal
23 condition of said fluid stream;

1 b. allowing said thermally conductive material of said conduit to thermally
2 engage said fluid stream such that said conduit develops an isothermal condition
3 equivalent to said fluid stream;

4 c. directing a flow of sample fluid from said fluid stream into said conduit while
5 allowing said temperature regulation means to thermally isolate said conduit from
6 ambient temperature; and

7 d. retrieving said sample fluid from said conduit.

8 33. (new) The apparatus of Claim 1, wherein said sample fluid passing through
9 said conduit is isothermally regulated by said heat pipe so as to maintain said
10 sample fluid at said isothermal condition of said fluid stream.

11 34. (new) The apparatus of Claim 10, wherein said sample fluid passing through
12 said conduit from said fluid stream is insulated by said vacuum jacket so as to
13 maintain said sample fluid at said isothermal condition of said fluid stream.

14 35. (new) The apparatus of Claim 15, wherein said sample fluid passing through
15 said conduit from said fluid stream is isothermally regulated by said insulated jacket
16 so as to maintain said sample fluid at said isothermal condition of said fluid stream.